
ट्रूइंग/ड्रेसिंग टूल्स, सिंगल
हीरा के लिए विनिर्देश
(दूसरा पुनरीक्षण)

Specification for Truing/Dressing
Tools, Single Diamond

(Second Revision)

ICS 27.100.10

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Abrasives Sectional Committee and approval of the Production and General Engineering Division Council.

Truing/dressing tools which have a diamond tip are used for truing/dressing the grinding wheel when the grinding surface has been worn out. The diamond truing tools may have a single diamond or several diamonds set in a suitable pattern which may be presented to the grinding wheel for dressing it. In this standard only the truing tools having a single diamond have been covered.

This standard was first published in 1964 and further revised in 1979. This standard is being revised so as to bring it in line with the various practices followed in the industry. In this revision the following additions have been made:

- a) Table 1, Table 2 and Table 3 are modified;
- b) The grades have been re-designated in **5.1**; and
- c) Normative references have been updated.

The recommendations for the guidance of users in the selection, use and care of diamond truing tools are given in Annex A.

The composition of the Committee responsible for the preparation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

SPECIFICATION FOR TRUING/DRESSING TOOLS, SINGLE DIAMOND

(Second Revision)

1 SCOPE

This standard covers the dimensions and requirements for truing/dressing tools with single diamond for truing/dressing grinding wheels.

2 REFERENCES

The following Indian Standard contain provisions which through reference in this text, constitute provisions of this standard, at the time of publication, the editions indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of standards indicated below:

<i>IS No</i>	<i>Title</i>
1715 : 2002	Self-holding tapers — Dimensions
919 (Part 2) : 2014/ ISO 286-2 : 2010	Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes: Part 2 Tables of standard tolerance classes and limit deviation for holes and shafts

3 DIMENSIONS

3.1 Parallel Shank Tools

3.1.1 The dimensions of truing tools with parallel shank and their diamond weight ranges shall be as given in Table 1.

NOTE — The clearances and tolerances mentioned in this standards as h11 or C11 shall be as per IS 919 (Part 2).

3.1.2 The dimensions of truing tools with parallel shank and head, and their diamond weight ranges shall be as given in Table 2. Parallel shank with a head shall be used when the diameter of the shank is not enough to accommodate the required diamond.

3.2 Taper Shank Tools

3.2.1 The dimensions of truing tools with morse taper shank and their diamond weight ranges shall be as given in Fig. 1 and 2.

3.2.2 The dimensions of truing tools with morse taper shank with head and their diamond weight ranges shall be as given in Fig. 3.

3.2.3 The dimensions of truing tools with metric taper shank and their diamond weight ranges shall be as given in Fig. 4.

4 MATERIAL

Shank Portion	—	Carbon steel of tensile strength not less than 700 MPa
Tip	—	Diamond of weight range as specified in 3.1 and 3.2.

5. GENERAL REQUIREMENTS

5.1 The dimensions of morse taper shanks and metric taper shanks shall be in accordance with IS 1715.

6 DIAMOND GRADE AND PERMISSIBLE VARIATION OF WEIGHT

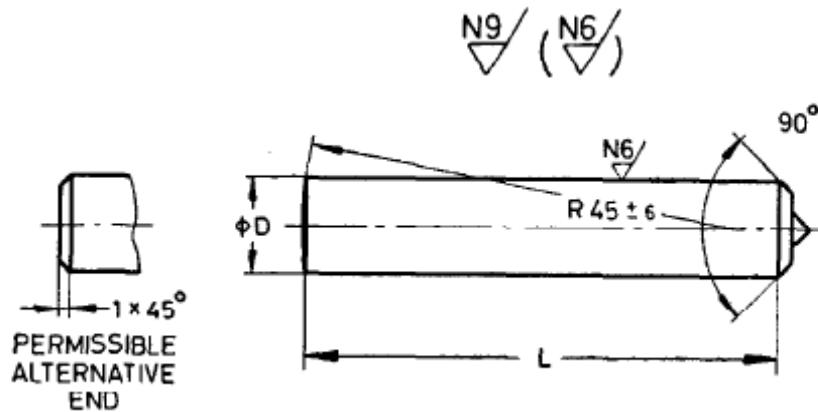
The method of finding out the correct metric carat weight of the diamond required for a particular grinding wheel is given in Annex B.

The grade of diamond used for diamond dressers shall conform to either of the following three grades:

Grade I	—	Diamond having 1 to 2 well defined natural points
Grade II	—	Diamond having 1 larger cut point
Grade III	—	Diamond having 1 bruited point

Table 1 Dimensions For Truing Tools with Parallel Shank

All the dimensions in millimeters



Nominal Size D h11	L		Weight Range of Diamond in Metric Carat*	
	Hand Operated	Machine Operated	Min	Max
6.0	125	50	0.10	0.40
8.0	125	50	0.20	0.75
10.0	125	50	0.30	1.5
12.0	125	125	0.50	3.0
16.0	125	125	0.50	5.0

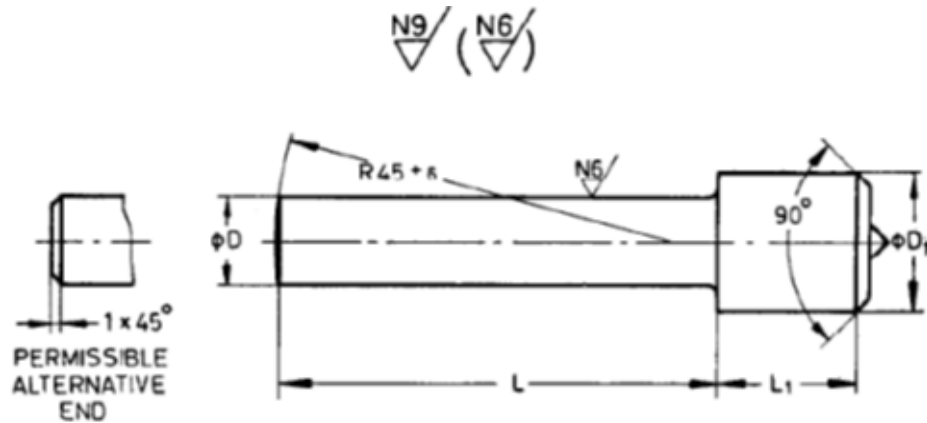
*1 metric carat = 0.200 g

Designation : A single diamond truing tool with parallel shank having nominal size D = 10.0 mm, diamond of weight range 1.5 carat and conforming to this standard, shall be designated as:

Truing Tool, Parallel Shank 10.0 × 1.5 IS 794

Table 2 Dimensions For Truing Tools With Parallel Shank

All dimensions in millimetres

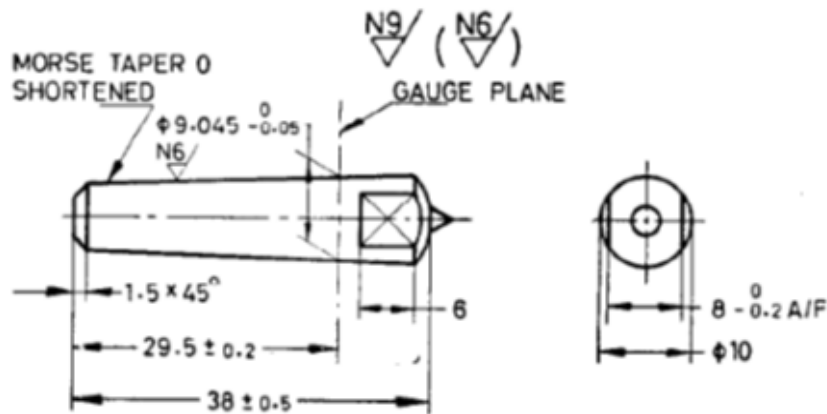


Nominal Size D h11	L		D ₁	L ₁	Weight Range of Diamond in Metric Carat*	
	Hand Operated	Machine Operated			Min	Max
6.0						
8.0	125	50	12.50	12.50	0.25	3.0
10.0						
10.0	125	50	16.0	16.0	0.50	5.0
12.0						

*1 metric carat = 0.200 g

Designation: A single diamond truing tool with parallel shank with head having nominal size D = 10.0 mm, diamond of weight range 3.0 carat and conforming to this standard shall be designated as:

Truing Tool, Parallel Shank with Head 10.0 × 3.0 IS 2794

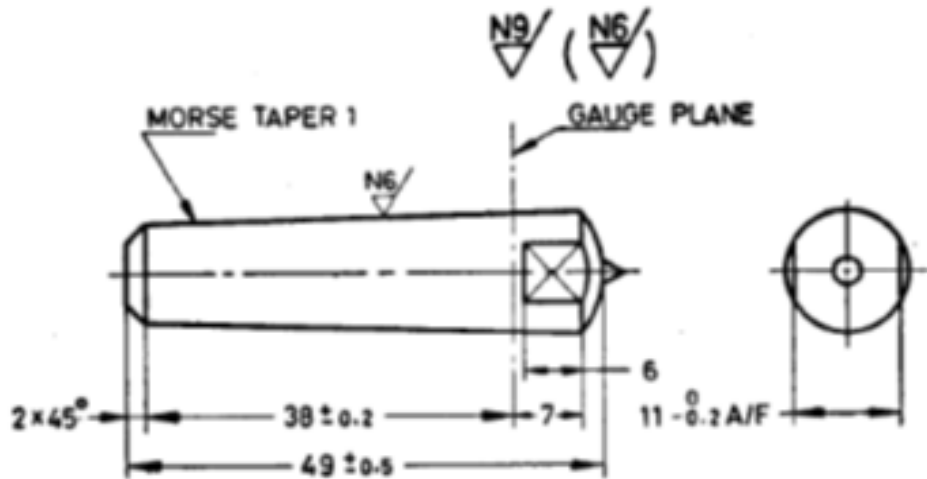


Weight range of diamond = 0.2 to 2.0 metric carat

FIG.1 DIAMOND TRUING TOOL WITH 'MORSE TAPER 0' SHANK

Designation: A single diamond truing tool with 'morse taper 0' shank having the dimensions as given in Fig. 1 and conforming to this standard shall be designated as:

Truing Tool, 'Morse 0' IS 2794

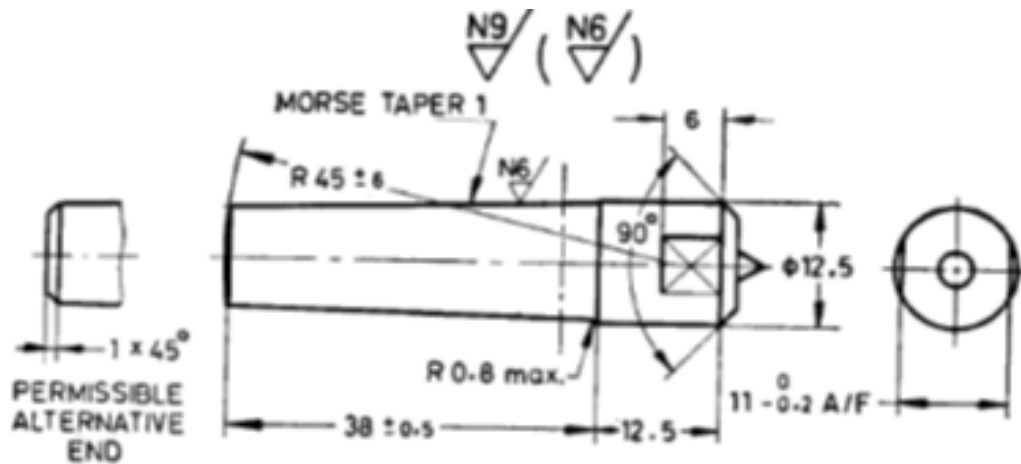


Weight range of diamond = 0.2 to 2.0 metric carat

FIG. 2 DIAMOND TRUING TOOL WITH 'MORSE TAPER 1' SHANK

Designation: A single diamond truing tool with 'morse taper 1' shank having the dimensions as given in Fig. 2 and conforming to this standard shall be designated as:

Truing Tool, 'Morse 1' IS 2794

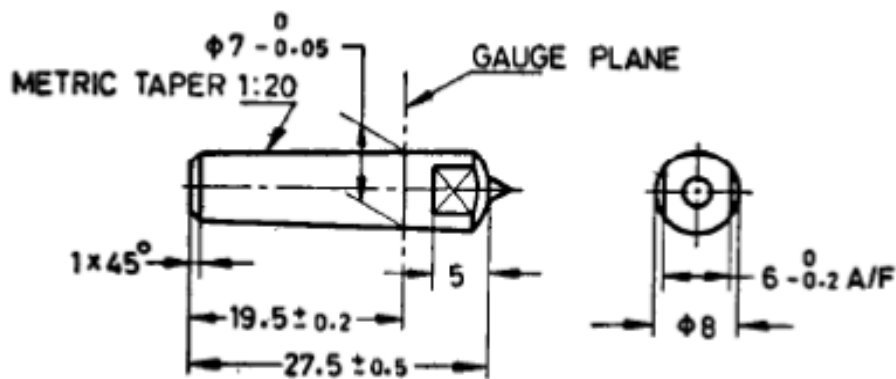


Weight range of diamond = 0.2 to 2.0 metric carat

FIG. 3 DIAMOND TRUING TOOL WITH 'MORSE TAPER 1' SHANK WITH HEAD

Designation: A single diamond truing tool with 'morse taper 1' shank with head having dimensions as given in Fig. 3 and conforming to this standard shall be designated as:

Truing Tool, 'Morse 1' with Head IS : 2794



Weight range of diamond = 0.2 to 2.0 metric carat

FIG. 4 DIAMOND TRUING TOOL WITH 'METRIC TAPER 1 : 20' SHANK

Designation: A single diamond truing tool with 'metric taper 1 : 20' shank having the dimensions as given in Fig. 4 and conforming to this standard shall be designated as:

Truing Tool, 'Metric 1 : 20' IS 2794

The permissible weight variation of diamonds used shall be as given in Table 3.

7 DESIGNATION

7.1 The designation of a diamond truing tool shall indicate:

- Commonly used name;
- Nominal size;
- Nominal weight of diamond in carats;
- Diamond, grade; and
- Number of this standard.

Table 3 Diamond Size Range and Weight Tolerances
(Clause 6.3)

Nominal Weight* Metric Carats	Acceptable Range* Metric Carats
0.10	0.08-0.12
0.20	0.18-0.22
0.25	0.23-0.30
0.35	0.31-0.42
0.50	0.43-0.63
0.75	0.64-0.87
1.00	0.88-1.12
1.50	1.38-1.63
2.00	1.85-2.12
2.50	2.13-2.65
3.00	2.66-3.25
3.50	3.26-3.65
4.00	3.66-4.25
4.50	4.26-4.65
5.00	4.66-5.25

*1 metric carat = 0.200 g

[#]1 MPa = 0.1 kgf/mm².

7.1.1 The examples of designation of different types of tools are given in relevant tables and figures.

8 WORKMANSHIP AND FINISH

8.1 Diamond shall be sintered into a steel shank in a suitable metal matrix having good diamond holding properties at a temperature below 750 °C to prevent oxidation of diamond.

8.2 Brazing of diamond to the steel shank is not permitted as diamond will crack/oxidize at high temperatures. All diamond points shall be natural and bruising of points is not permitted.

9 PROTECTION AND PACKING

The diamond truing/dressing tools shall be packed securely in suitable containers with suitable cushioning material to prevent movement of each tool within the containers and adequately cased, so that the tool is capable of withstanding normal transit risks. The diamond portion of the tool shall be suitably protected.

10. MARKING

10.1 Each tool shall be marked with the following information:

- Nominal size,
- Nominal weight of diamond in carats,
- Diamond grade,
- Manufacturer's serial number, and
- Manufacturer's name or trade-mark.

10.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(Foreword)

RECOMMENDATIONS FOR THE GUIDANCE OF USERS IN THE SELECTION, USE AND CARE OF DIAMOND TRUING TOOLS

A-1 TOLERANCES FOR SOCKETS FOR TRUING TOOLS

The tolerance for the bores of sockets into which the parallel shanks of diamond truing tools are fitted is recommended to be H7.

A-2 SELECTION OF DIAMOND TRUING

A-2.1 For a proper selection of diamond truing tools the following variables should be taken into consideration:

- a) *Grinding wheel variables*
 - 1) Type of abrasive,
 - 2) Grain size,
 - 3) Grade,
 - 4) Type of bond, and
 - 5) Diameter and width of face,
- b) *Diamond variables*
 - 1) Diamond grade,
 - 2) Size, and
 - 3) Shape.
- c) *Operating variables*
 - 1) Angle of presentation
 - 2) Wet or dry truing,
 - 3) Depth of cut and rate of feed (traverse),
 - 4) Peripheral speed of wheel,
 - 5) Type of material being ground and degree of finish required,
 - 6) Whether plain or form grinding,
 - 7) Type of general condition of machine, and
 - 8) Operator's skill
- a) *Correct wheel balance;*
- b) *Rigidity of mounting;*
- c) *Angle of presentation* — The diamond shall be presented to the wheel in a trailing attitude. The angle between the axis of the truing tool holder and a line drawn through the centre of the grinding wheel and the point of contact in the periphery shall be 5° (127 mm) and 15° (381 mm) (see Fig. 5);
- d) *Cutting edge* — The cutting edge of the diamond shall be on the centre line of the grinding wheel at the point of contact;
- e) *Depth of cut* — The depth of cut in general shall not exceed 0.05 mm;
- f) *Adequacy of coolant system, where used* — It is essential that the coolant shall be turned on before the diamond makes contact with the wheel. In case the diamond is accidentally overheated, it shall not be quenched, as this may cause the diamond to shatter.
- g) *Adequate machine maintenance;*
- h) *Systematic rotation of tool and regular inspection* — To ensure withdrawal from use in sufficient time to permit economic servicing;
- j) *Re-classification of diamonds after servicing* — In the light of the operating variables given in A-2.1; and
- k) *Sharpening of diamonds* — To help in sharpening all the diamonds and to avoid marks on the wheel face, the canting of the diamond tools shall be at an angle of 30° with the plane of the wheel (see Fig. 5). This method is not applicable while dressing internal grinding wheels.

A-2.1.1 It is recommended that the users should consult the manufacturer regarding correlation of these variable factors and guidance for a proper selection of truing tools.

A-3 RECOMMENDATIONS FOR USE AND CORE OF DIAMOND TRUING TOOLS

A-3.1 The attention of the users is drawn to the following while using diamond truing tools:

A-4 TOOL HOLDER

A-4.1 For diamond truing tools with morse/metric taper, tapered tool holder is the most suitable one. The tool when fitted in this holder does not get loosened by vibration and remains stable.

A-4.2 The morse/metric taper bore of the holder shall be free from scratches, dents or damages to ensure positive grip on the truing tool.

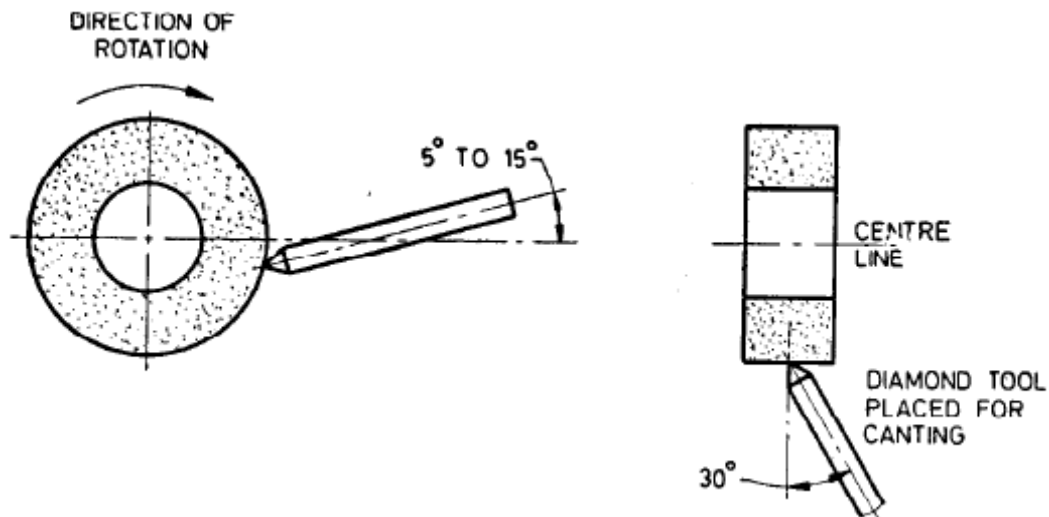


FIG.5 RANGE OF ANGLE OF PRESENTATION OF TOOL

ANNEX B

(Clause 6)

METHOD OF FINDING OUT THE CORRECT METRIC CARAT WEIGHT OF THE DIAMOND REQUIRED FOR A PARTICULAR GRINDING WHEEL

B-1 The formula to calculate the correct carat weight of the diamond required is given below:

$$\alpha = \frac{D + 2W}{254}$$

where

α = weight of the diamond required in carats;

D = diameter of grinding wheel, in mm; and

W = width of grinding wheel, in mm.

Example:

For a grinding wheel having diameter = 900 mm and width = 58 mm, the weight of the required diamond should be:

$$\frac{900 + (2 \times 58)}{254} = 4 \text{ carats}$$

B-2 The above is one of the many empirical formulae allowing selection of a diamond of a suitable carat weight in relation to the grinding wheel being dressed.

B-2.1 None of these formulae can be justified on analytical grounds and the most suitable is probably the one easiest to remember and to apply.

B-2.2 Very elaborate empirical formulas have been devised, taking into account the following characteristics:

- a) Diameter of grinding wheel,
- b) Width of grinding wheel,
- c) Type of abrasive,
- d) Grit size of abrasive,
- e) Wheel bond,
- f) Wheel hardness, and
- g) Diamond quality.

B-2.2.1 These more elaborate formulae have the advantage that they draw people's attention to the influence of these factors, but have the disadvantage that they cause additional work and fall into disuse by neglect.

B-3 The nomogram may be used in lieu of the formulae given under **B-1** for finding out the correct metric carat weight of the diamond required for particular grinding wheel (see Fig.6).

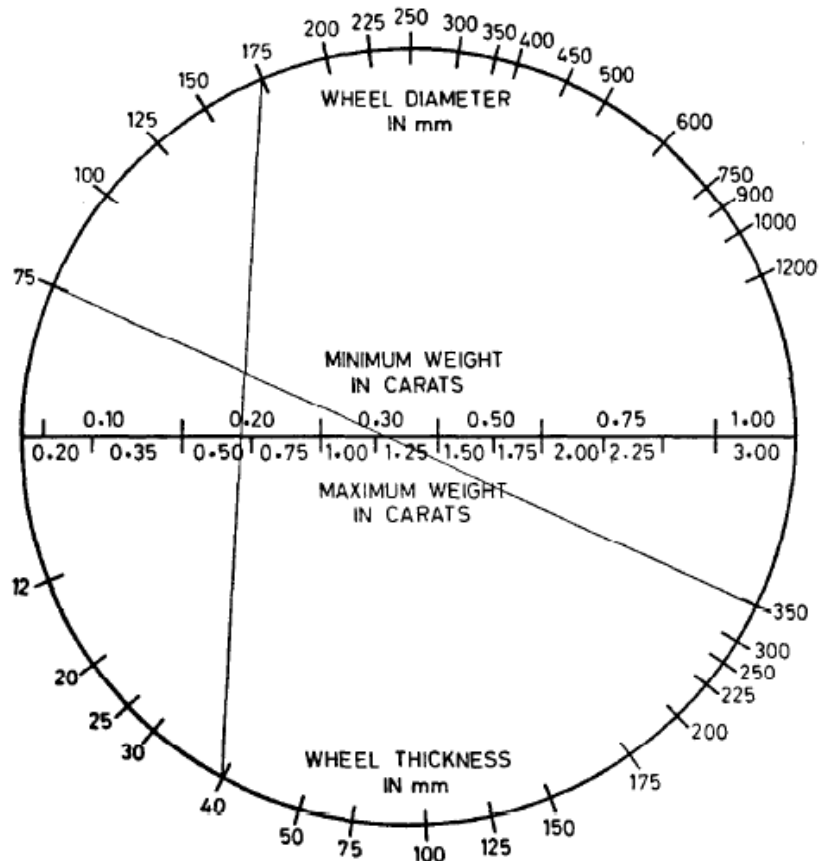


FIG .6 NOMOGRAM

ANNEX C*(Foreword)***COMMITTEE COMPOSITION**

Abrasives Sectional Committee, PGD 09

<i>Organisation</i>	<i>Representative(s)</i>
In personal Capacity	SHRI NIRANJAN SAHASRABUDHE (Chairman)
Grindwell Norton Ltd, Mumbai	SHRI AJAY DESHPANDE
Research & Development Estt (Engrs), Pune	SHRI N. K. CHAUDHARY SHRI VINOD KUMAR PANDEY (<i>Alternate</i>)
Bharat Heavy Electricals Limited, Haridwar	SHRI VAIBHAV BANSAL SHRI HARSHIT ANAND (<i>Alternate</i>)
Bosch Limited, Bengaluru	SHRI RAJESH N. SHRI SUBRAHAMANYA (<i>Alternate</i>)
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Director General of Quality Assurance, New Delhi	LT COL S. CHOUDURY SHRI Y. NAGI REDDY (<i>Alternate</i>)
Controllerate of Quality Assurance (General Stores), Kanpur	SHRI S. S. KASHYAP SHRI J. K. YADAV (<i>Alternate</i>)
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LBCR Corporation	SANTOSH ANANT POTNIS
Stay Sharp Diamond Tools Pvt Ltd, Mumbai	DR VIVEK SINGAL
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This Indian Standard has been developed from Doc No.: PGD 09 (15816).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi